

IOTC-2011-WPTT13-45

*(Revised title and authors)***Kobe Plot I and II software (ver. 1)***(Plot I) Stock trajectories and (Plot II) Risk assessment matrix diagram***Users' manual**

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Tom NISHIDA^{1/}, Yasunari MATSUO^{2/}, Toshihide KITAKADO^{3/} and Kiyoshi ITOH^{2/}

- 1/ Corresponding author (tnishida@affrc.go.jp), National Research Institute of Far Seas Fisheries (NRIFSF), Fisheries Research Agency, Shimizu, Shizuoka, Shizuoka, Japan
 2/ Environmental Simulation Laboratory (ESL) Inc., Kawagoe, Saitama, Japan
 3/ Tokyo University of Marine Science and Technology, Tokyo, Tokyo, Japan

Abstract and Notice (release of the software)

This is the users' manual describing how to use the Kobe plots software that can create Kobe I (Stock trajectories) and II (Risk assessment matrix) diagrams. This software is created by (partially) applying our recent technology used in "Marine GIS (Geographic Information System) (*Marine Explorer*)" (<http://ocean-info.ddo.jp/mesupport/en/>). Regarding the Kobe II diagram (risk assessment matrix), 5 tuna RFMOs meeting (2010) recommended to produce its matrix. But the matrix (table) has been quite difficult to understand its meanings especially for managers as it uses mathematical notations. Thus we improve this situation by converting the matrix to the diagram, so that anyone can easily understand its meanings. **This software is free of charge. If someone wants to obtain this software, please contact the corresponding author.** Then after using this software and if any improvements are needed, please DO let us know. We will revise and make the better software and will release the improved version in the (near) future.

Please note well that this software is suitable for those who have difficulties to make Kobe plots and risk assessments diagrams quickly and efficiently in very short time especially during the working meetings. However this software is not needed for those who can make these plots/diagrams easily and/or create better ones as this software is designed to make the fixed outputs (plots and diagrams) with some extended flexibilities such as colors, fonts, symbols etc (see the text for details). This software development project was funded by Fisheries Research Agency (FRA) of Japan (2009-2011) for the Tropical Tuna Group in the National Research Institute of Far Seas Fisheries (NRIFSF).

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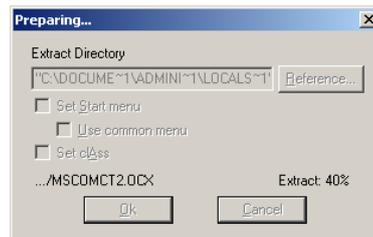
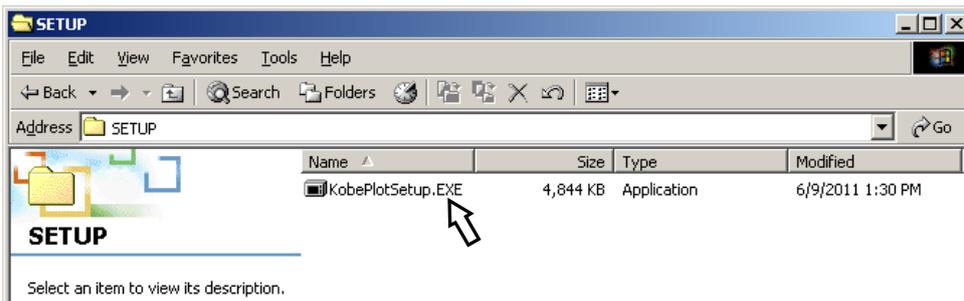
Submitted to the IOTC WPTT13 (16-23 October 2011), Paradise Island, Lankanfinolhu, North Malé Atoll, Maldives

1. Introduction

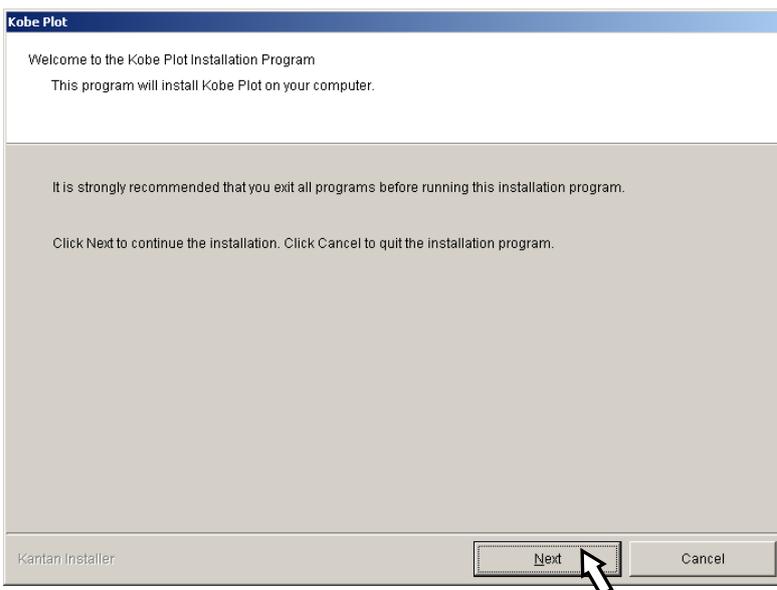
This Kobe Plot software consist of **Kobe Plot I (stock trajectories)** and **Kobe Plot II (risk assessments)**. **Kobe Plot I** can make a stock trajectory plots on SSB/SSBmsy (or TB/TBmsy) vs. F/Fmsy. **Kobe Plot II** can depict results of risk assessments.

2. Installation

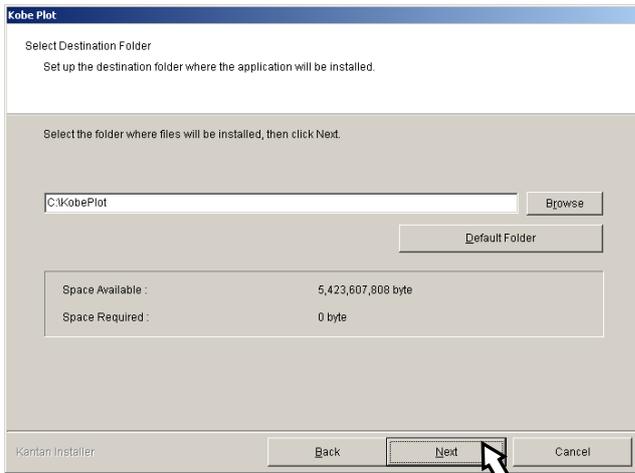
1) Double-click on **KobePlotSetup.exe**.



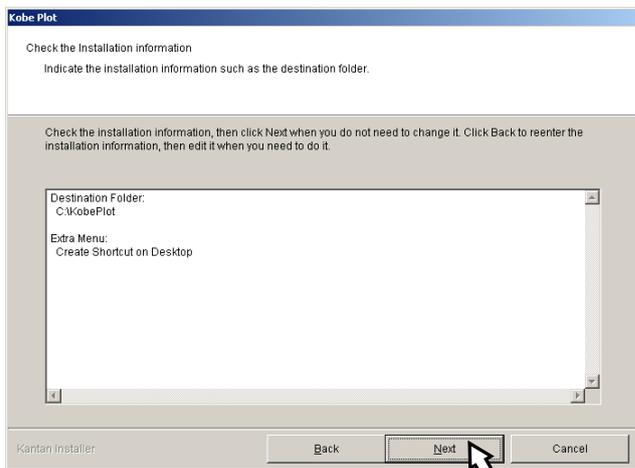
2) Click **Next**



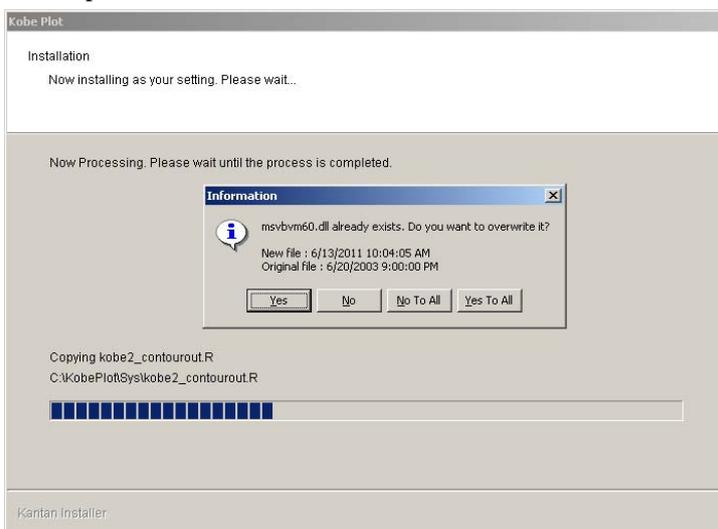
3) **CAUTION:** You cannot install **Kobe Plot** into c:\Program Files if you are a Windows Vista or Windows 7 due to users account control.



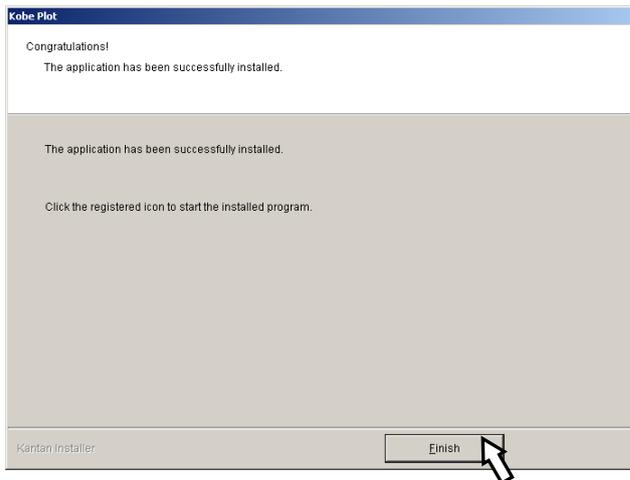
4) Click **Next**



5) You will be asked to replace already existing files with new files. Work on one by one, and leave, or replace it to, the one has the newer date.



6) Click **Finish**



7) **Kobe Plot** requires you to install a free software **R**.

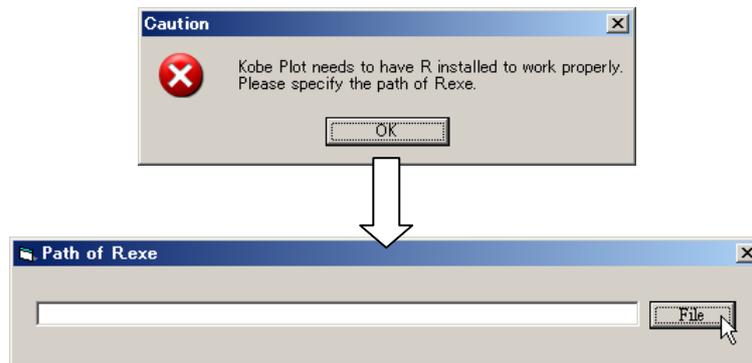
To install the latest **R**, go to <http://cran.md.tsukuba.ac.jp/bin/windows/base/>

3. Starting the software

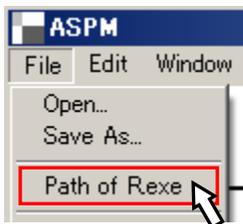
1) Click the **Kobe Plot** icon located on your desktop window.



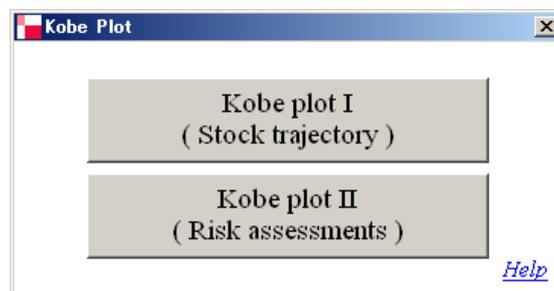
2) You might be asked to specify the path of the **R.exe** when launching **Kobe Plot** for the first time. Specify the path of the **R.exe**.



3) You can change the path of R.exe later from **File > Path of R.exe**.



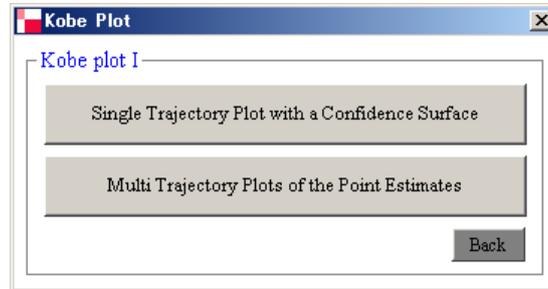
4) Then start window will appear as below.



If you want to make stock trajectories, click **Kobe Plot I**. If you want to make the diagram on the risk assessments, click **Kobe Plot II**.

4. Kobe Plot I (stock trajectory)

There are two options on Kobe plot I (stock trajectory), one for one single plot with/without confidence surface and another for multi-plots without confidence surface as below.



4.1 Kobe 1 plot (Option 1): A single plot with confidence surface

1) How to create the input data?

To create the input data, make a CSV file as below, i.e., year (column 1), Biomass: SSB (TB) ratio (column 2) and F ratio (column 3). If you want to create the confidence surface, add 2 columns, results of re-sampling by MCMC or bootstrap, i.e., Biomass: SSB (TB) ratio (column 5) and F ratio (column 6).

Year	X	Y	X	Y
year	B ratio	F ratio	B(ratio)	F(ratio)
1995	1.911086	0.467377	0.850656	0.97836
1996	1.740271	0.576566	0.632261	1.289523
1997	1.60543	0.613848	0.778326	1.065882
1998	1.485294	0.720373	0.749311	1.101676
1999	1.398416	0.716378	0.399919	1.959125
2000	1.352262	0.737683	0.81428	1.021804
2001	1.34276	0.69241	0.684303	1.198776
2002	1.345249	0.70972	0.918728	0.912832
2003	1.285747	0.850866	0.771306	1.072266
2004	1.193665	0.918775	0.606479	1.338571
2005	1.177828	0.792277	0.467253	1.692282
2006	1.235294	0.711052	0.83434	0.997083
2007	1.29276	0.696405	0.649239	1.258571
			0.80995	1.024397
			0.94041	0.889817
			0.989355	0.848734
			0.768794	1.079511

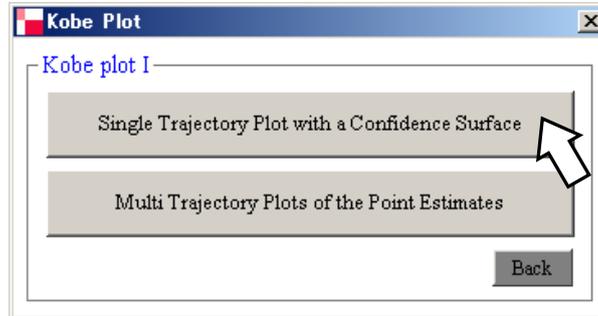
Columns 4-5:
Input data for the confidence surface

The order of columns is important, follow the example.

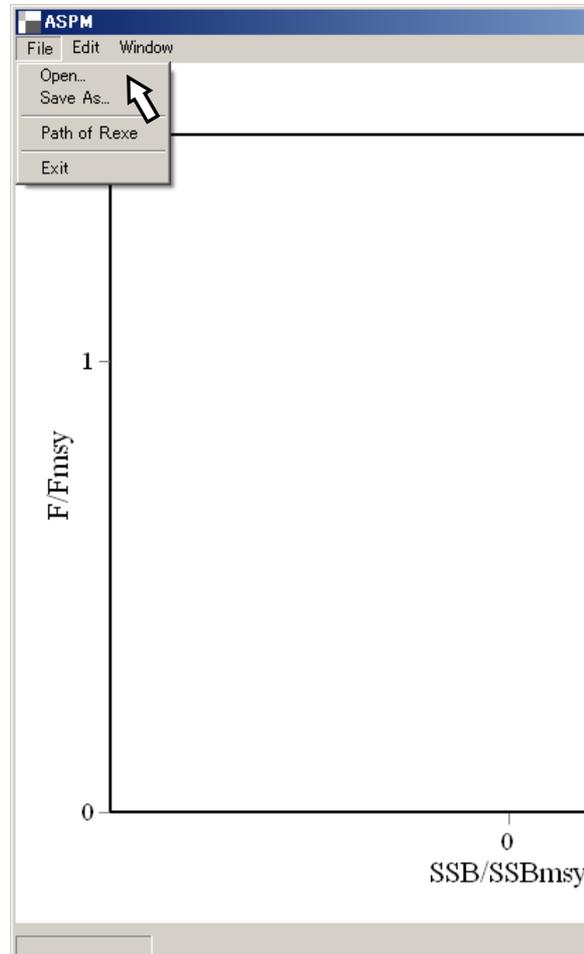
Columns 1-3: Input data for a single plot

2) How to get the input data into the software?

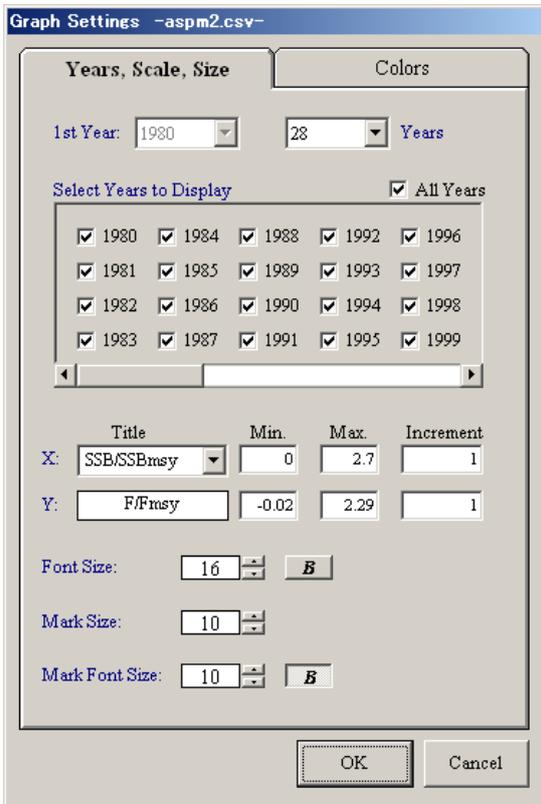
Click the Single trajectory with the confidence surface



Then you will see the empty window (see right). Then click file, open, then go to the folder where your CVS file is located and import to the software. Then you will see the graph setting menus as described (next page), which are self-explanatory. You can adjust various parameters to create your desirable output (diagram).



3) Graph Settings



Years, Scale, Size

Years Set the number of years to display.

Select Years to Display

Choose each year individually to display/un-display.

X Axis

Choose SSB/SSBmsy or TB/TBmsy. Set values of the minimum, the maximum and the interval of X axis.

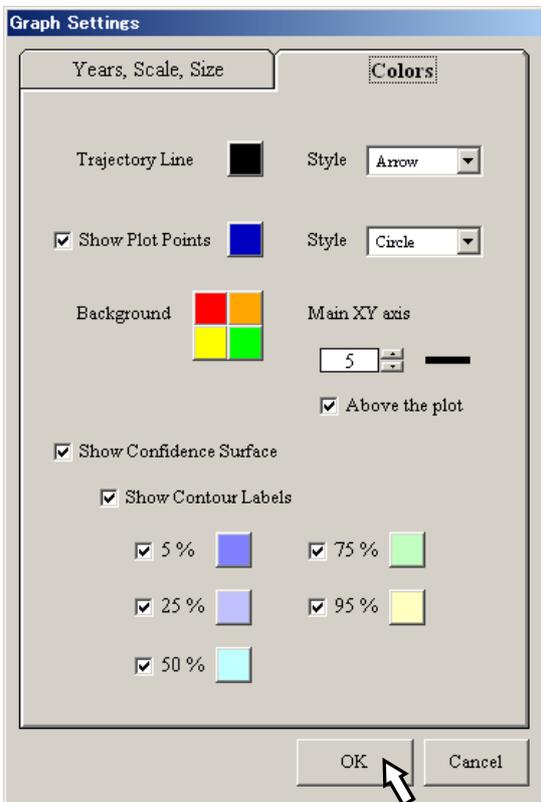
Y Axis (F/Fmsy)

Set values of the minimum, the maximum and the interval of Y axis.

Font Size Select the font size. Click **B** to make the font bold.

Mark Size Select size of marks (circles presenting the plots).

Mark Font Size Select the font size of “years (last 2 digits)” to be displayed inside of the mark (point). Click **B** to make the font bold.



Colors

Trajectory line Select the color of the line and the style either Arrow or Line.

Plot Points Select the color of the Plot and the style.

Background Select Background colors.

Main XY axis Select the width and choose above or behind of plots.

Show Confidence Surface

Check the box to show the Confidence Surface with contour lines.

Show Contour Labels

Check the box to show contour labels.

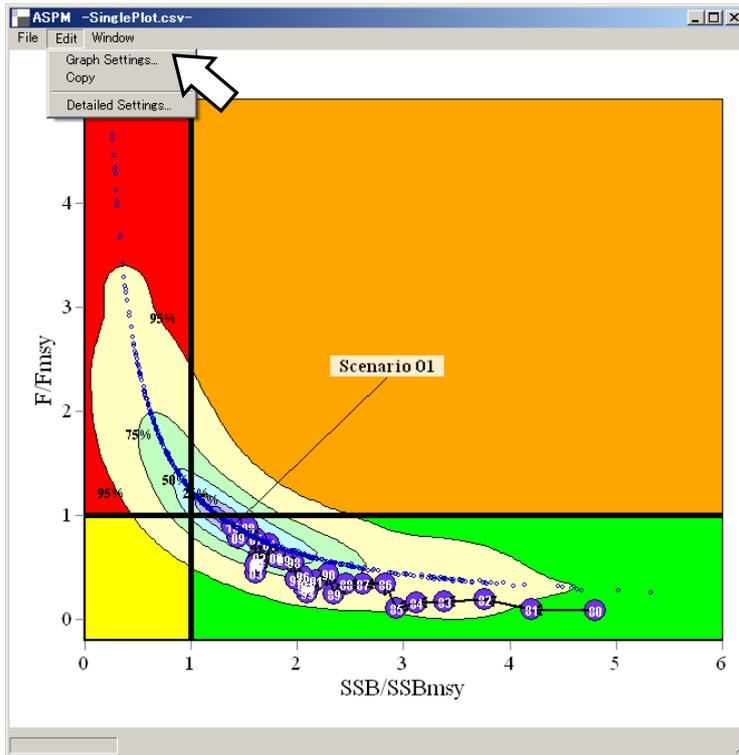
Check the box to show the percentage labels.

4) Displaying the Kobe plots (stock trajectory)

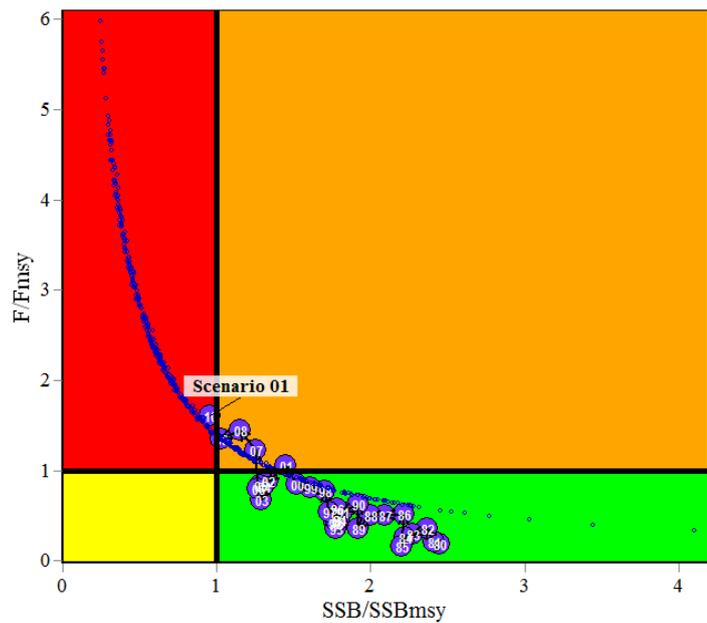
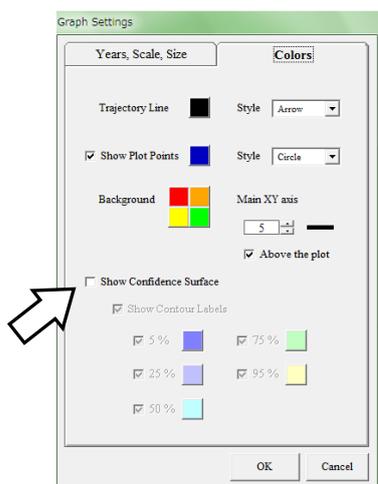
After you set up the graph setting, click OK button (see previous page), then you will get the Kobe plot (see example below).

5) Editing the plots

If you want to edit the plots, click Graph setting and go back there then edit. Repeat this exercise until you get the satisfactory plots.



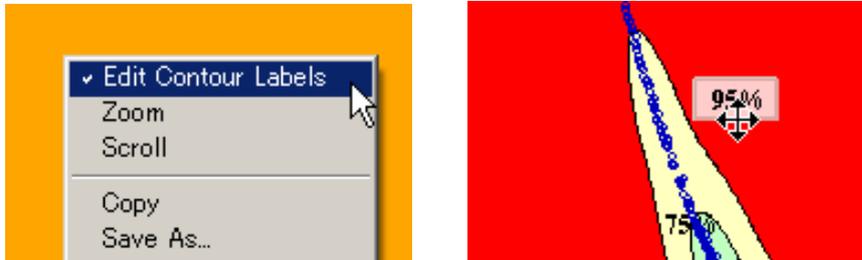
Sample
Stock trajectory
(Kobe I) plot
with
the confidence surface
(left)
and
without (below)



If you don't want show the confidence surface, leave the selection button OFF in the graph setting.

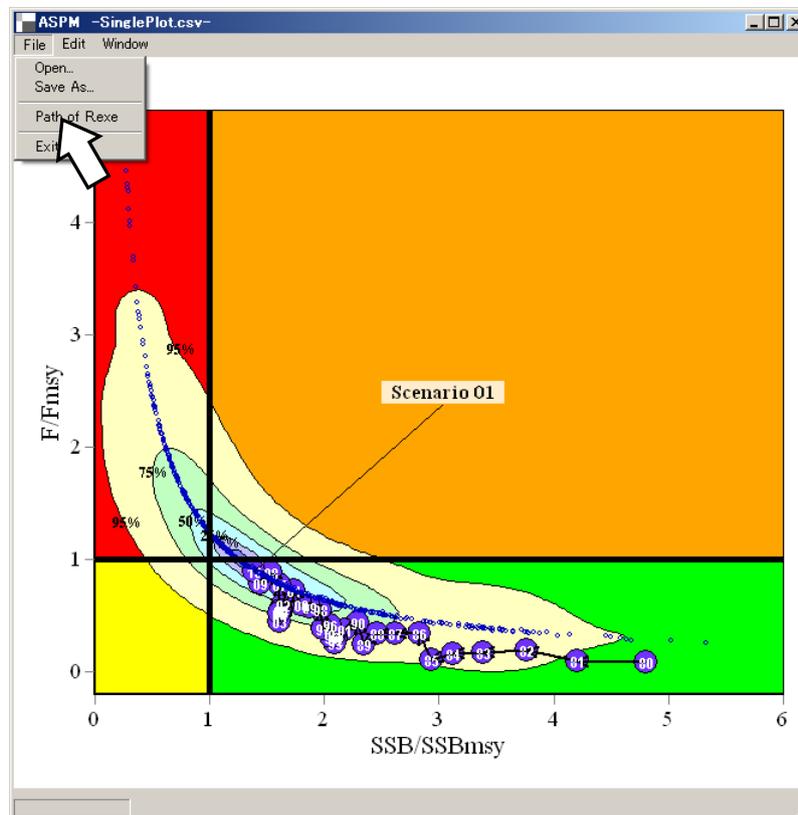
Moving the location of the contour percentage labels

Move the cursor to the percentage label of the plot and click the right button, then the context menu will appear as below. Select **Edit Contour Labels** and put the cursor on the percentage label (e.g. 95%) then move it to where you desire.



6) Saving the plots

After you finalize the plots, save the plots by click “Save As”. There are 4 ways to save using 4 different types of external file, i.e., .KB2, .BMP, .PNG, and .EMF. If you save “.KB2” file, then you can retrieve the last plot that you save then you can do further editions. “.EMF” file is recommended to use for your paper/document file as it will provide the best quality of picture.



4.2 Kobe Plot I (option 2): Multiple plots without confidence surface

This option will produce 2 or more Kobe plots 1 (stock trajectories).

1) How to create the input data?

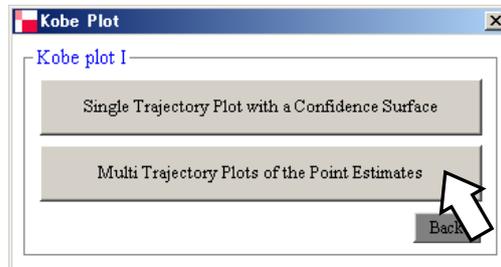
To create the input data, make one CSV file as below, i.e., year (column 1), then the data for the first plot: Biomass: SSB (TB) ratio (column 2) and F ratio (column 3), then for the second plot: Biomass: SSB (TB) ratio (column 4) and F ratio (column 5) and so on.

Year	X	Y	X	Y	X	Y
year	TB(ratio)(1)	Fratio(1)	TB(ratio)(2)	Fratio(2)	TB(ratio)(3)	Fratio(3)
1970	3.74E+00	2.78E-02	3.13E+00	5.21 E-03	5.31 E+00	6.90E-06
1971	4.72E+00	1.69E-02	3.12E+00	6.12E-03	5.31 E+00	2.14E-04
1972	6.12E+00	1.20E-02	2.92E+00	7.15 E-03	5.37E+00	1.29E-03
1973	7.51E+00	1.22E-02	2.83E+00	6.67E-03	5.44E+00	1.76E-03
1974	7.81E+00	2.35E-02	2.13E+00	1.09E-02	5.41 E+00	4.18E-03
1975	6.71E+00	3.52E-02	1.86E+00	2.20E-02	5.46E+00	3.06E-03
1976	5.29E+00	3.66E-02	1.77E+00	3.00E-02	5.41 E+00	4.61 E-03
1977	4.39E+00	3.33E-02	1.99E+00	1.67E-02	5.45E+00	5.45E-03
1978	4.09E+00	3.67E-02	2.17E+00	1.22E-02	5.39E+00	5.71E-03
1979	3.95E+00	5.11E-02	2.19E+00	1.23E-02	5.38E+00	6.90E-03
1980	3.85E+00	4.93E-02	1.82E+00	1.91 E-02	5.36E+00	8.43E-03
1981	3.72E+00	4.98E-02	1.96E+00	1.77E-02	5.42E+00	8.31E-03

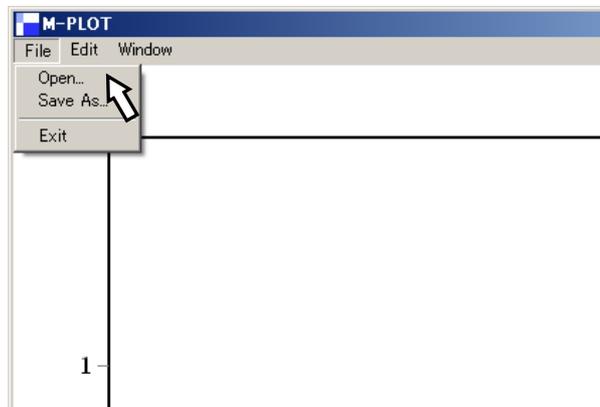
You can use the normal decimal numbers (not necessary to use the data with E shown in this example). The order of columns is important, follow the example. The number of scenarios (plots) is not limited.

2) How to get the input data into the software?

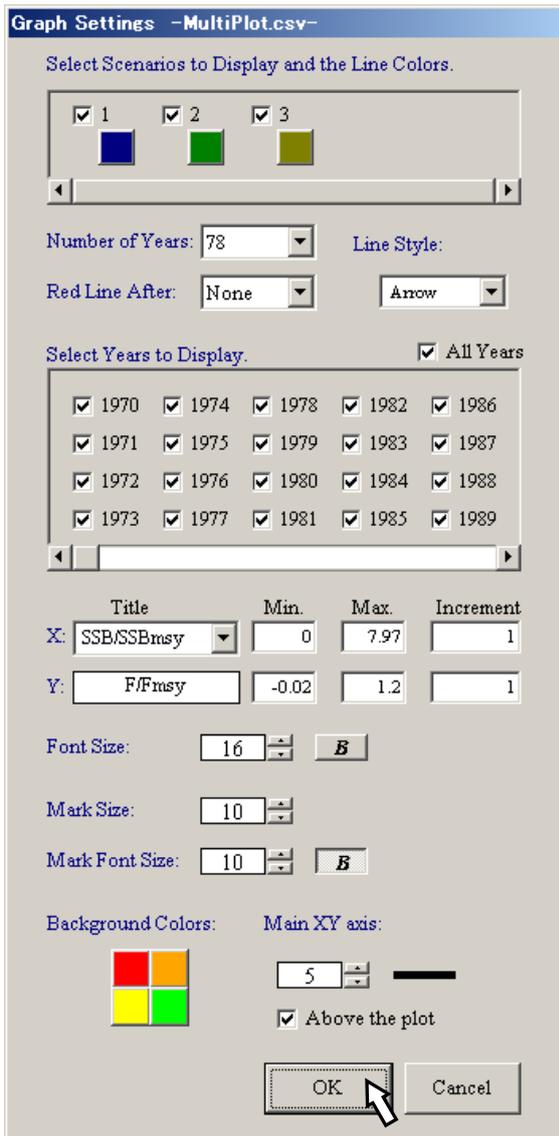
Click the Multi trajectory plots.



Then you will see the empty window as below. Then click file, open, then go to the folder where your CVS file is located and import to the software. Then you will see the graph setting menus as described next page, which are self-explanatory. You can adjust various parameters to create your desirable output (diagram).



3) Graph Settings



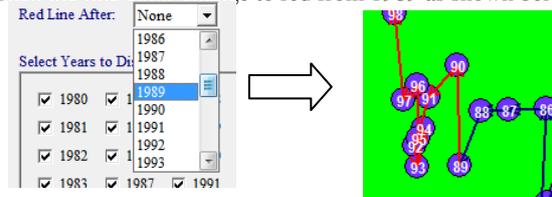
Number of Years

Choose the number of years to display. If you select 30 for example, then the trajectory lines with the first 30 years will be displayed.

Red Line After

If you want to change the color of the trajectory lines to red starting from some year in order to highlight/emphasize, select the year (see example below).

Then the line color change to red from 1989 as shown below.



Line Style

Choose the Line style either Arrow or

Select Years to Display

Choose each year individually to display/un-display. Please note, in this box, only years that you select (above) appear.

X Axis

Choose SSB/SSBmsy or TB/TBmsy. Set values of the minimum, the maximum and the interval of X axis.

Y Axis (F/Fmsy)

Set values of the minimum, the maximum and the interval of Y axis.

Font Size

Select the font size. Click **B** to make the font bold.

Mark Size

Select size of marks (circles presenting the plots).

Mark Font Size

Select the font size of “years (last 2 digits)” to be displayed inside of the mark (point). Click **B** to make the font bold.

Background Colors

Select Background colors.

Main X Y axis

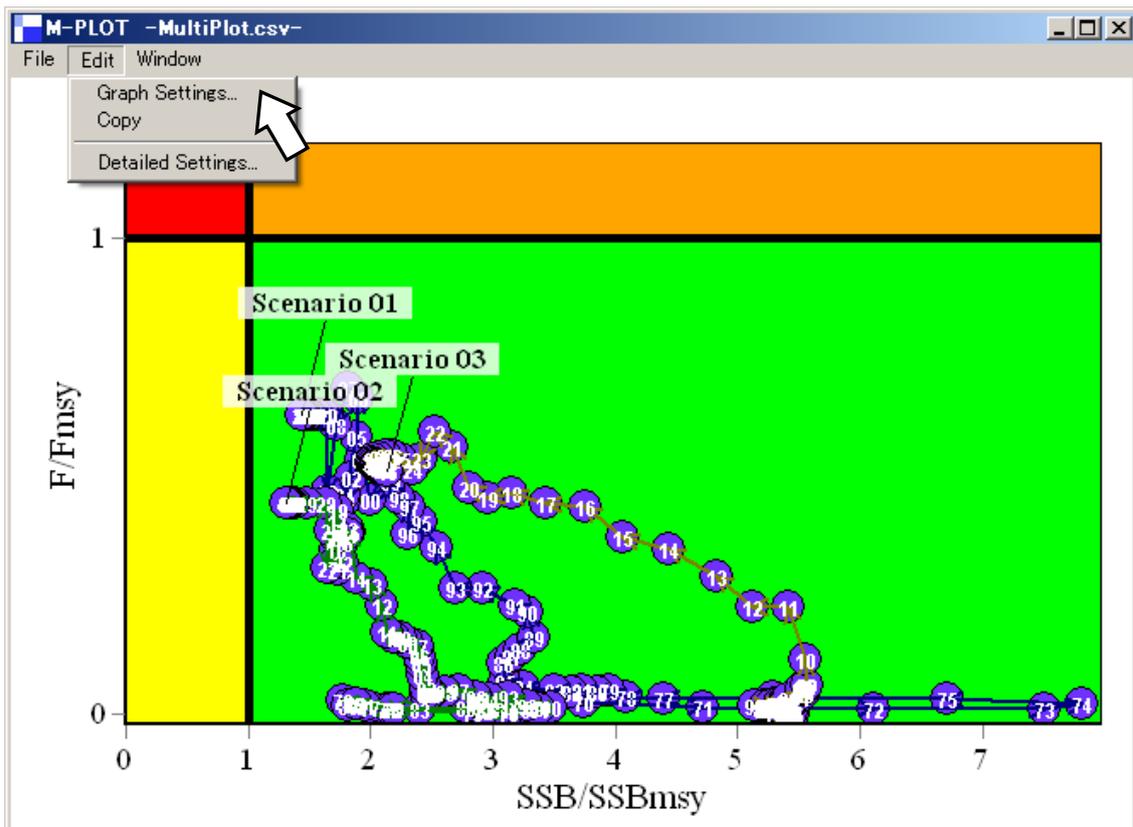
Select the width and choose above or behind of plots.

4) Displaying the Kobe plot I (multiple plots)

After you set up the graph setting, click OK button (see previous page), then you will get the Kobe plot I (multi plot options) (see example below).

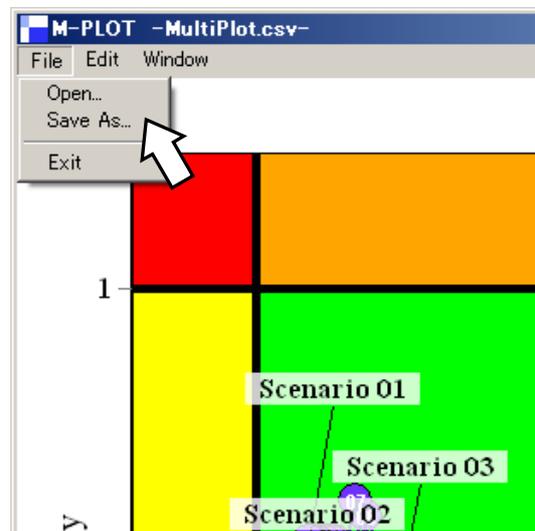
5) Editing the plots

If you want to edit the plots, click Graph setting and go back there then edit. Repeat this exercise until you get the satisfactory plots.



6) Saving the plots

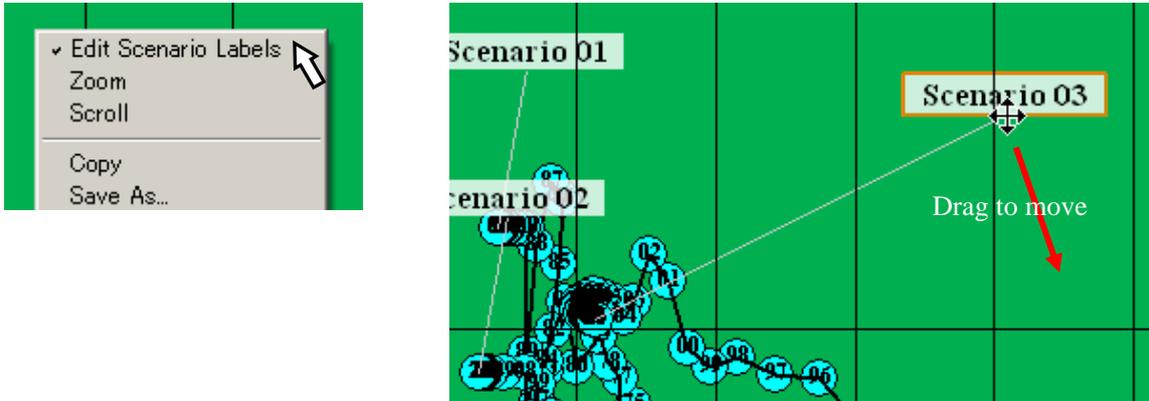
After you finalize the plots, save the plots by clicking "Save As". There are 4 ways to save using 4 different types of external file, i.e., .KB2, .BMP, .PNG, and .EMF. If you save ".KB2" file, then you can retrieve the last plot that you save then you can do further editions. ".EMF" file is recommended to use for your paper/document file as it will provide the best quality of picture.



4.3 Common functions in Kobe I plot

1) Editing Scenario Labels

Click the right button in the plot area, then the context menu will appear as below (left). Check **Edit Scenario Labels**. Then click the label you want to move and drag it to where you desire (right).



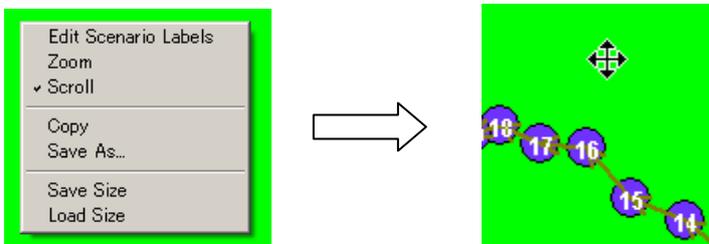
You can rename scenario labels after you move, or click the scenario label that you want to edit, and then edit the text.



Press the **Enter** key to finish editing.

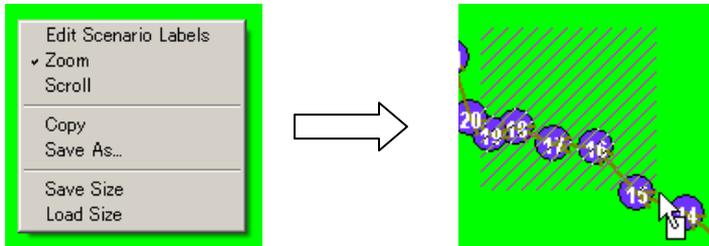
2) Scrolling

Click the right button in the plot area then the context menu will appear (see below). Select Scroll then drag the cursor so that you can scroll the plot area any directions as you wish.

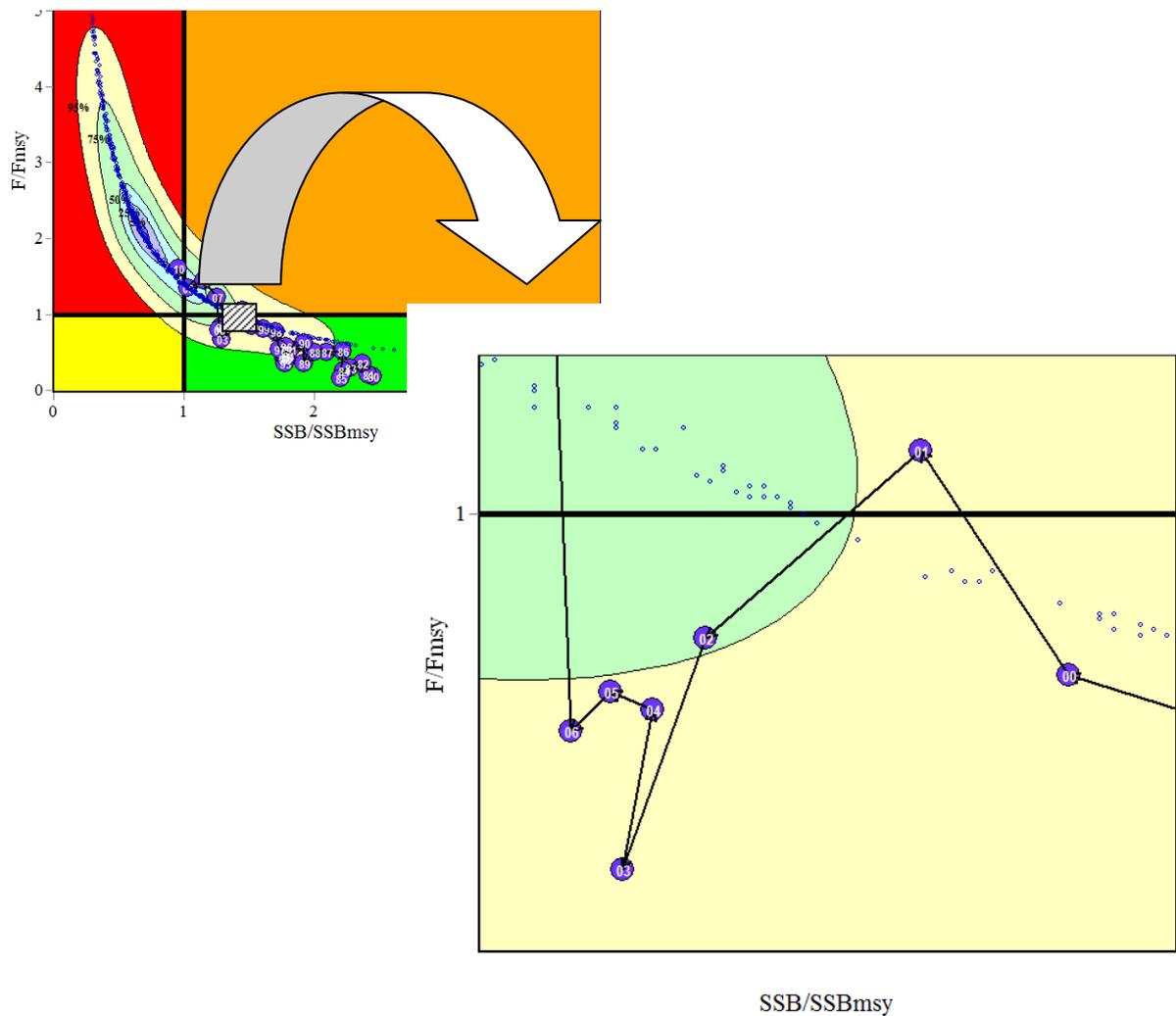


3) Zooming the plot area

Move the cursor to the plot area that you want to zoom, and then the context menu will appear as below (left). Select **Zoom** and drag the cursor to the area you want to zoom then the area to be zoomed will be highlighted with slash line as below (right).



Then zoomed area will appear (e.g. see below). To go back to the original plot, click the left button then drag towards the left-upper corner. Then you will get back the original plot.



5. Kobe Plot II (Risk assessment matrix diagram)

Kobe II (Risk assessment matrix) was recommended to produce by 5 tuna RFMOs meeting (2010). The risk matrix here means the risk probabilities that SSB/TB ratio and F ratio will exceed their MSY levels in 3 and 10 years. But the matrix (table) has been quite difficult to understand its meanings especially for managers (even for some scientists) as the matrix is described by the mathematical notations (see below). To improve this situation, we developed the KOBE II plot by converting the matrix to the diagram, so that anyone can easily understand the meanings of the matrix. We applied spatial contour estimation techniques used in our marine GIS (Marine Explorer).

Probability	Constant Catch Level (relative to 2009)				
	60%	80%	100%	120%	140%
B(2012) <B(MSY)	0.04	0.08	0.11	0.12	0.15
F(2012) >F(MSY)	<0.01	0.02	0.09	0.16	0.27
B(2019) <B(MSY)	0.04	0.08	0.11	0.13	0.21
F(2019) >F(MSY)	<0.01	0.02	0.09	0.23	0.31

1) How to create the input data?

To create the input data, make one CSV file based on the risk matrix for 10 years as below, i.e., Column 1: percentage increase or decrease from the current catch (status quo). Columns 2-11 projected years and corresponding risk probabilities by percentage (Y axis). This format is the diagrams for both SSB/TB ratio and F ratio.

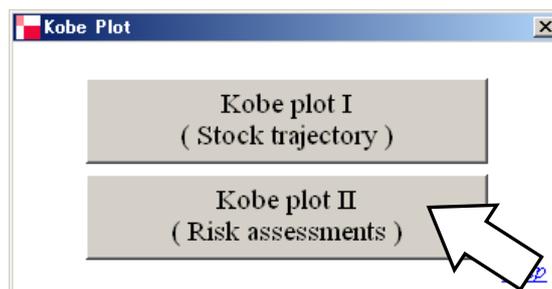
	Years (X Axis)									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
-40	0.678	0.662	0.652	0.644	0.614	0.586	0.558	0.534	0.514	0.48
-20	0.836	0.856	0.872	0.892	0.908	0.916	0.924	0.94	0.954	0.954
0	0.912	0.932	0.954	0.98	0.982	0.988	0.99	0.992	0.992	0.996
20	0.968	0.984	0.99	0.992	0.994	0.996	0.996	0.998	0.998	0.998
40	0.988	0.992	0.994	0.996	0.998	0.998	0.998	1	1	1

Percentage (Y Axis)

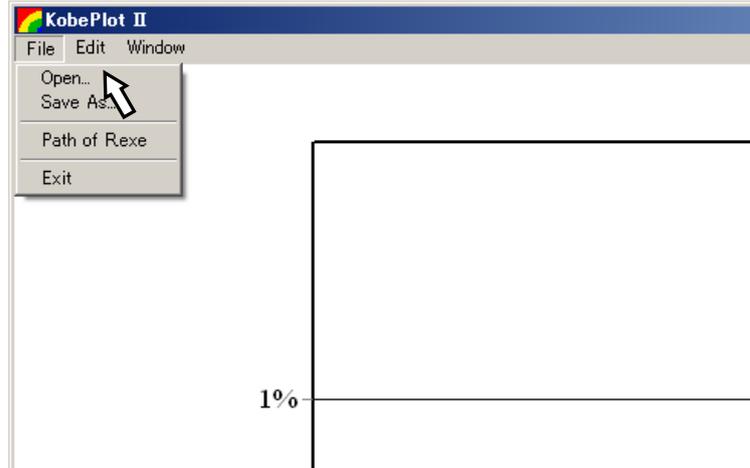
Risk probabilities

2) How to get the input data into the software?

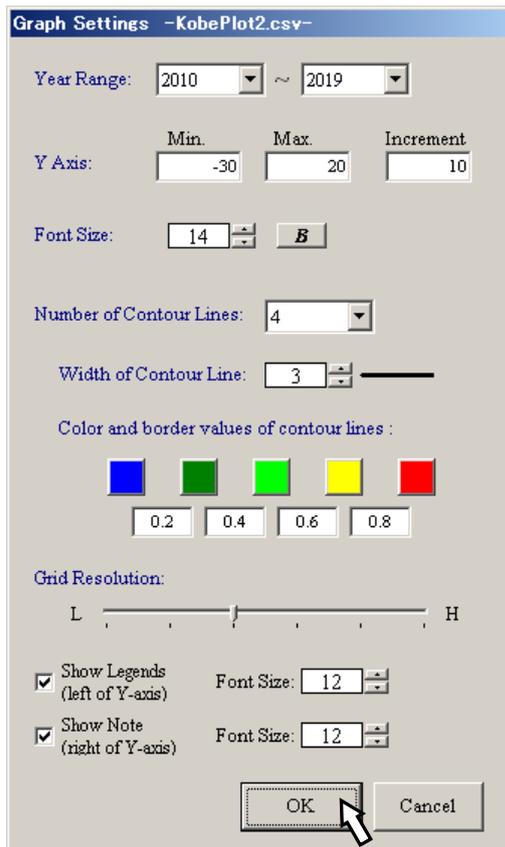
Click Kobe Plot II



Then you will see the empty window (see right). Then click file, open, then go to the folder where your CVS file is located and import to the software. Then you will see the graph setting menus as described below, which are self-explanatory. You can adjust various parameters to create your desirable output (diagram).



3) Graph Settings



Year Range

Set the year range to display.

Y Axis

Set values of the minimum, the maximum percentage and the interval (increment).

Font Size Select the font size. Click on the **B** button to make the font bold.

Number of Contour Lines

Select the number of contour lines from 2 to 4.

Width of Contour Lines

Select the width of contour lines from 0 to 10.

Colors and border values

Set colors and border values of the contour lines

Grid Resolution

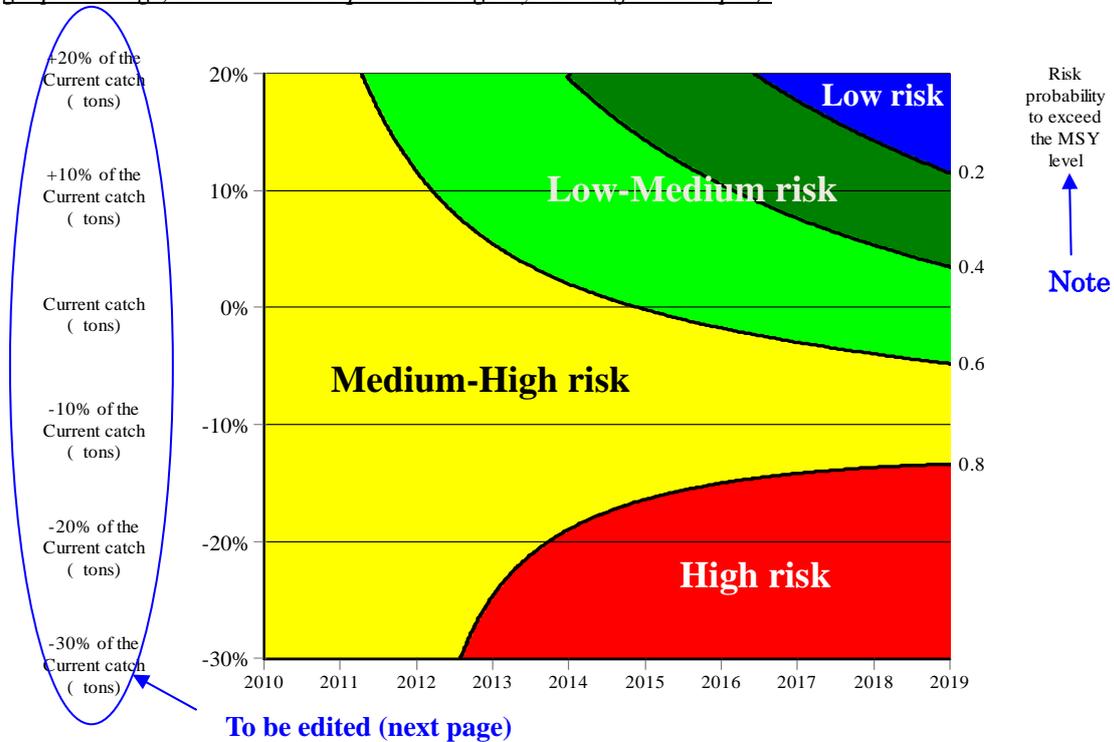
Move the grid resolution bar for the optimum resolution of the diagram (default position is recommended).

Legends/Note and Font size

Tick the box to show Legend (left of Y-axis) or Note (right) (refer to the sample, next page) and select Font size.

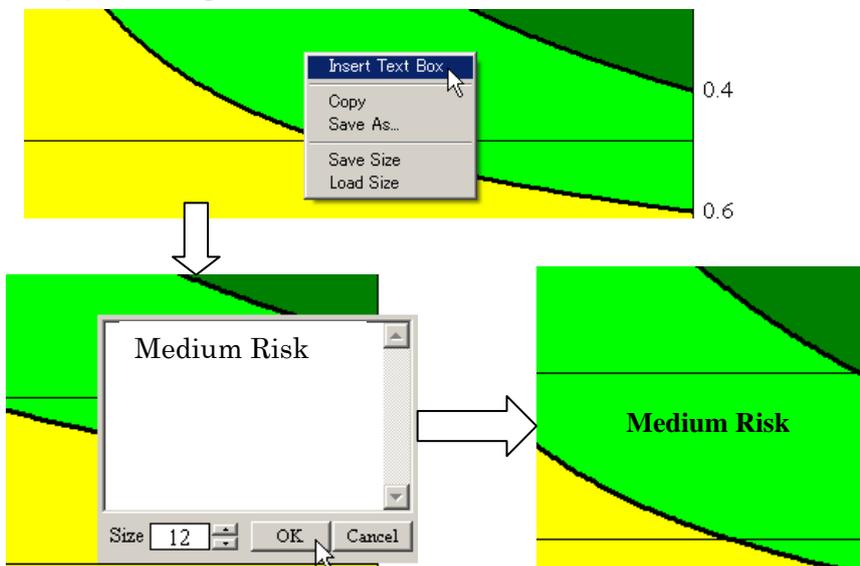
4) Displaying the Kobe plot II diagram (SSB/TB ratio or F ratio)

After you set up the graph setting, click OK button (see previous page), then you will get the Kobe plot II (risk assessment matrix) as below. *[Note] You can change (-40%) – (40%) by 20% interval by graph settings, which is the requested range by IOTC (for example).*



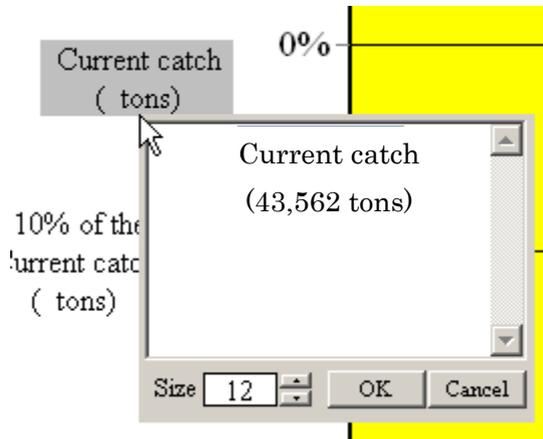
5) Insert/Edit the text in the diagram

You can create the text anywhere in the diagram. First, move the cursor to the location where you want to make text box then click the right button on the diagram. You will see the context menu as below. Click **Insert Text Box** then make the text. You can drag the text box by the cursor to move the location that you want to place.



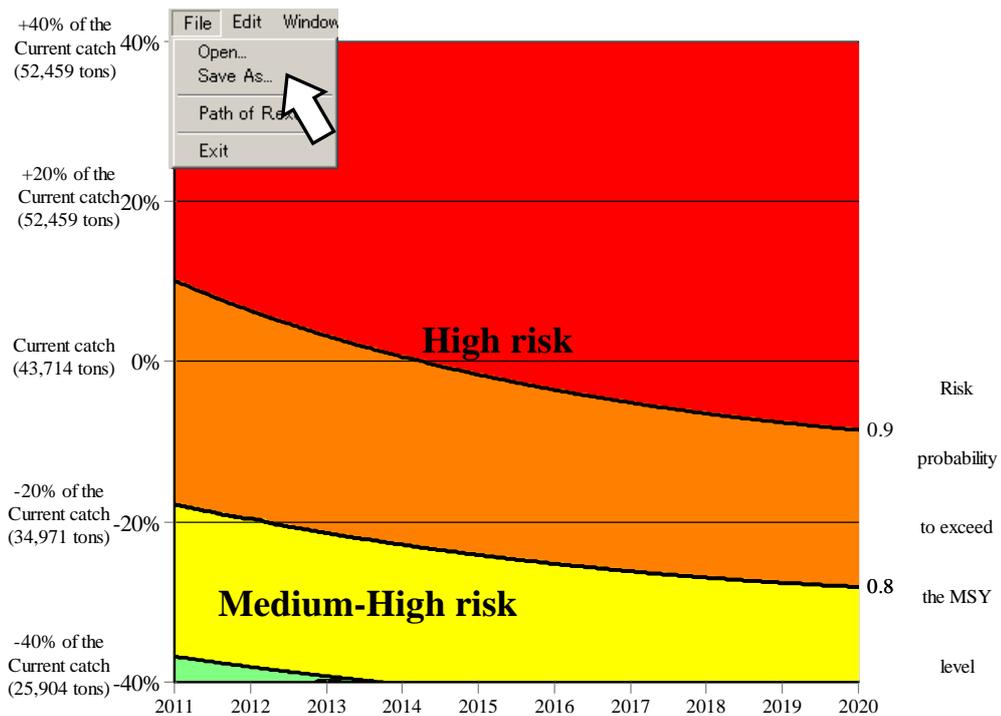
6) Editing Legend (left of Y-axis)

Click the legend you want to edit. After finish, click **OK** button. You can adjust the legend location by dragging the text box to the place you desire



7) Saving the diagram

After you finalize the plots, save the plots by click **“Save As”**. There are 4 ways to save using 4 different types of external file, i.e., .KB2, .BMP, .PNG, and .EMF. If you save **“KB2”** file, then you can retrieve the last diagram that you save then you can do further editions. **“EMF”** file is recommended to use for your paper/document file as it will provide the best quality of picture.



Appendix A: Specification of Kobe plots I and II

This software combined following application and program engines.

General

- VB6 (to be replaced to VB.Net for MS window 7 and 8) (general programming)
- TeeChart Pro 6J (graphical components)

Confidence surface in Kobe plot I and contour estimations in Kobe plot (diagram) II

'R' is linked to the main application (above) and following functions are applied:

Confidence surface

- 'kde2d' function : Kernel estimation
(suggested by Kitakado, one of co-authors of this document)

Kobe plots 2 (Contour estimation of the diagram)

- 'surf.gls' function :to assign contour surface by least square means
- 'prmat' function: to assign the contour line by kriging